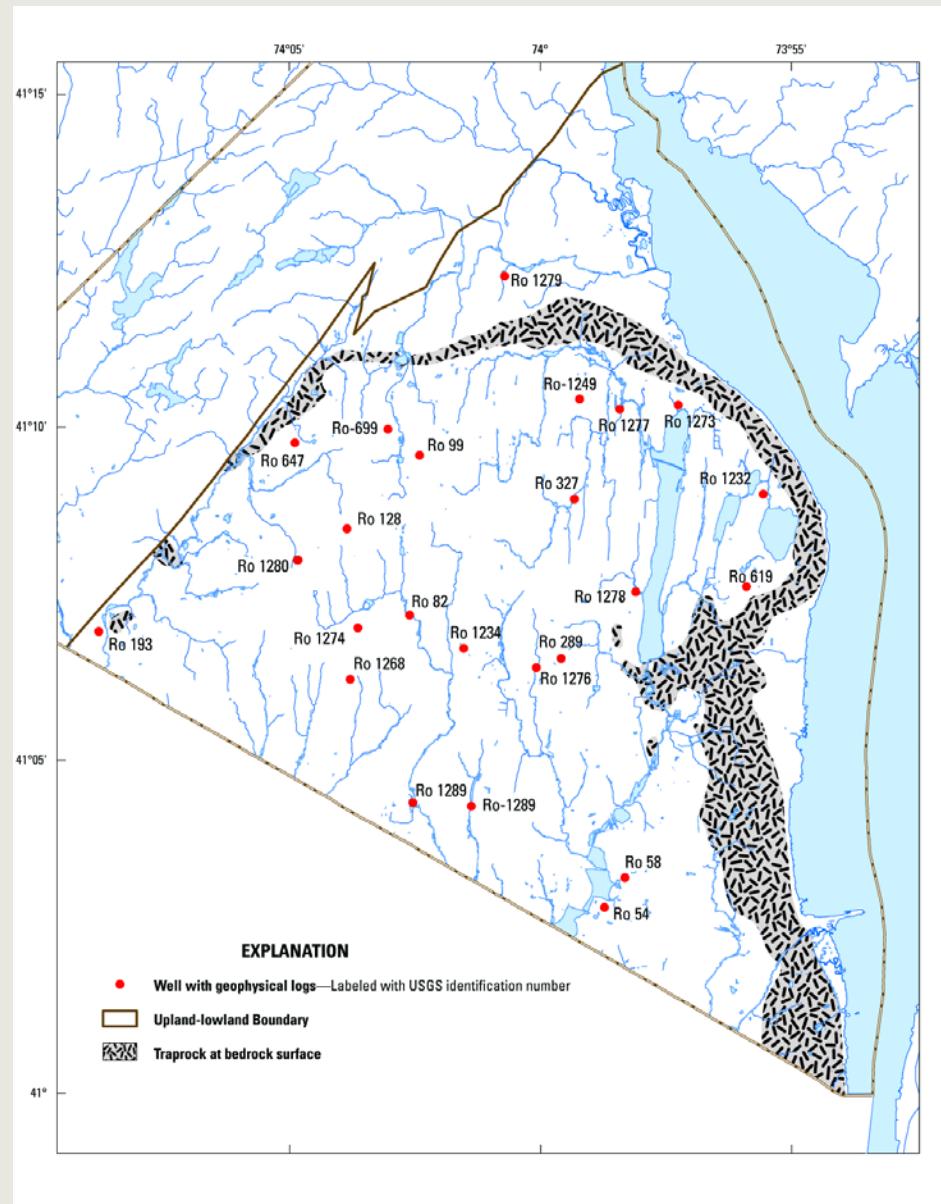


Appendix 1A. Borehole geophysical logs from Rockland county, New York

- A. Ro 54
- B. Ro 58
- C. Ro 82
- D. Ro 99
- E. Ro 128
- F. Ro 193
- G. Ro 289
- H. Ro 327
- I. Ro 564
- J. Ro 619
- K. Ro 647
- L. Ro 699
- M. Ro 1232
- N. Ro 1234
- O. Ro 1249
- P. Ro 1268
- Q. Ro 1273
- R. Ro 1274
- S. Ro 1276
- T. Ro 1277
- U. Ro 1278
- V. Ro 1279
- W. Ro 1280
- X. Ro 1289



Location map for borehole-geophysical logs

Explanation

Ro-54.....U.S. Geological Survey (USGS) well identification number

Depth.....Depth, in feet below land surface

Gamma.....Natural gamma radiation log, in counts per second (CPS)

Caliper.....Caliper; borehole diameter in inches

Acoustic image....Acoustic televiewer; 360-degree acoustic image of borehole wall oriented to True Geographic North

Optical image.....Optical televiewer; 360-degree optical image of borehole wall oriented to True Geographic North

Dip, in degrees (Tadpole plot)....Tadpole plot of planar fracture and bedding features oriented to True Geographic North, body of tadpole indicates dip angle and tail indicates dip direction (azimuth) (0-360);

Black – bedding

Gray – Low-angle fractures (<30 degrees)

White – high-angle fractures (>30 degrees)

Green – bedding or dissolved zones (fractures) that bound high-gamma beds

Magenta – mineralized zones

Blue – low-angle water-bearing fractures

Light blue – high-angle water-bearing fractures

Flowmeter Amb Flow.... .Ambient flow, in gallons per minute (gal/min); blue symbol indicates flow measurement with heat-pulse or EM flowmeter at specified depth; blue line indicates modeled flow based on USGS analysis (at selected wells).

Flowmeter Pmp Flow..... Pumped flow, in gal/min; red symbol indicates flow measurement with heatpulse or electromagnetic (EM) flowmeter at specified depth; red line indicates modeled flow based on USGS flow-log analysis (at selected wells).

Fl cond. (amb or pmp)....Fluid conductance, in microsiemens per centimeter (uS/cm) (amb – ambient; pmp pumped)

Fl cond. (amb or pmp) YSI ..Fluid conductance, in microsiemens per centimeter (uS/cm) (amb – ambient; pmp pumped) measured manually with Yellow Springs Instruments (YSI) TLC Meter.

Fl Temp (amb or pmp)....Fluid Temperature, in degrees Fahrenheit (Deg F)

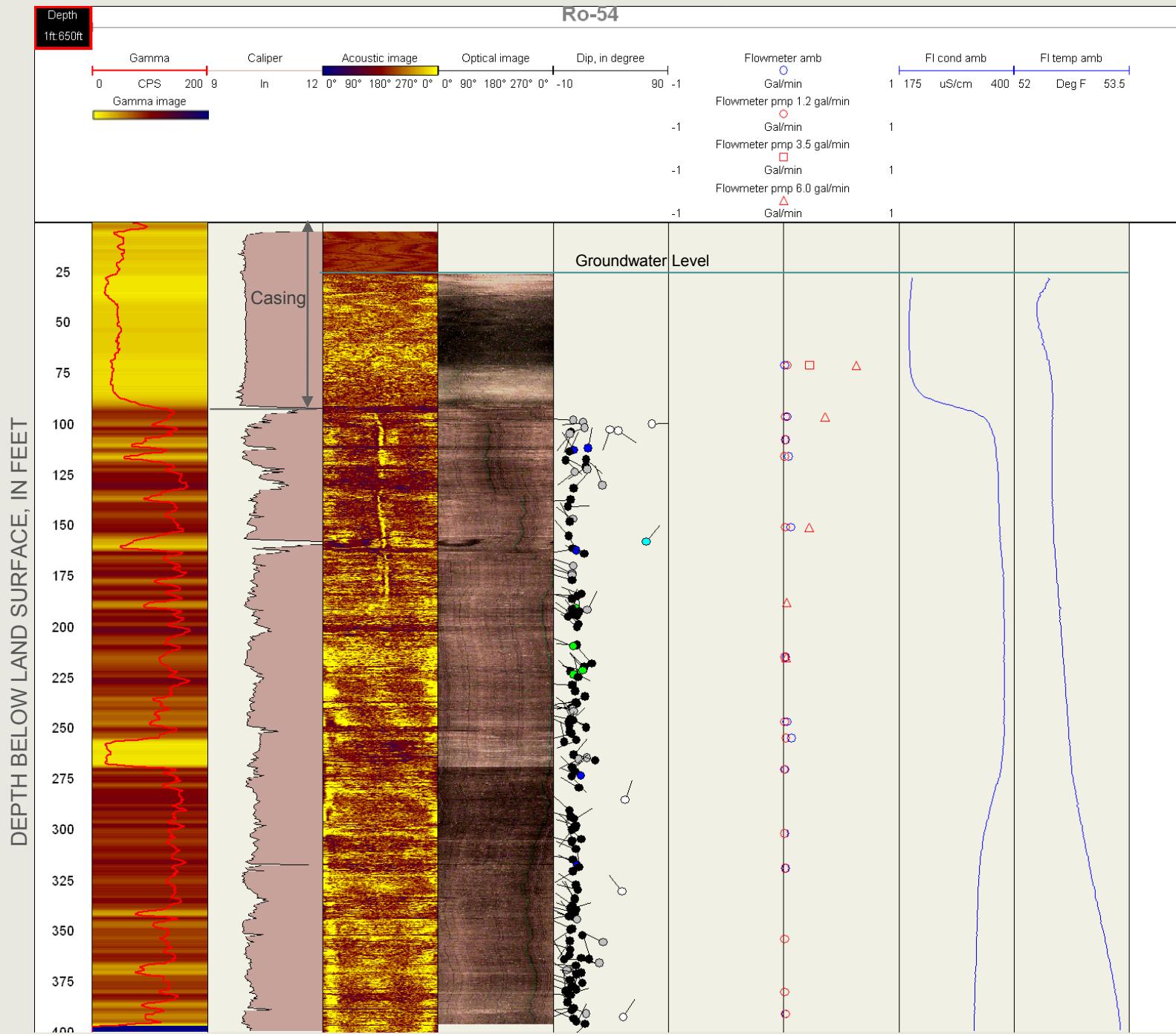
Tran.....Modeled transmissivity (T) of flow zone based on USGS flow-log analysis, in feet squared per day (ft²/day)

Water level.....Modeled water levels associated with flow zones based on USGS flow-log analysis, in feet below land surface (ft)

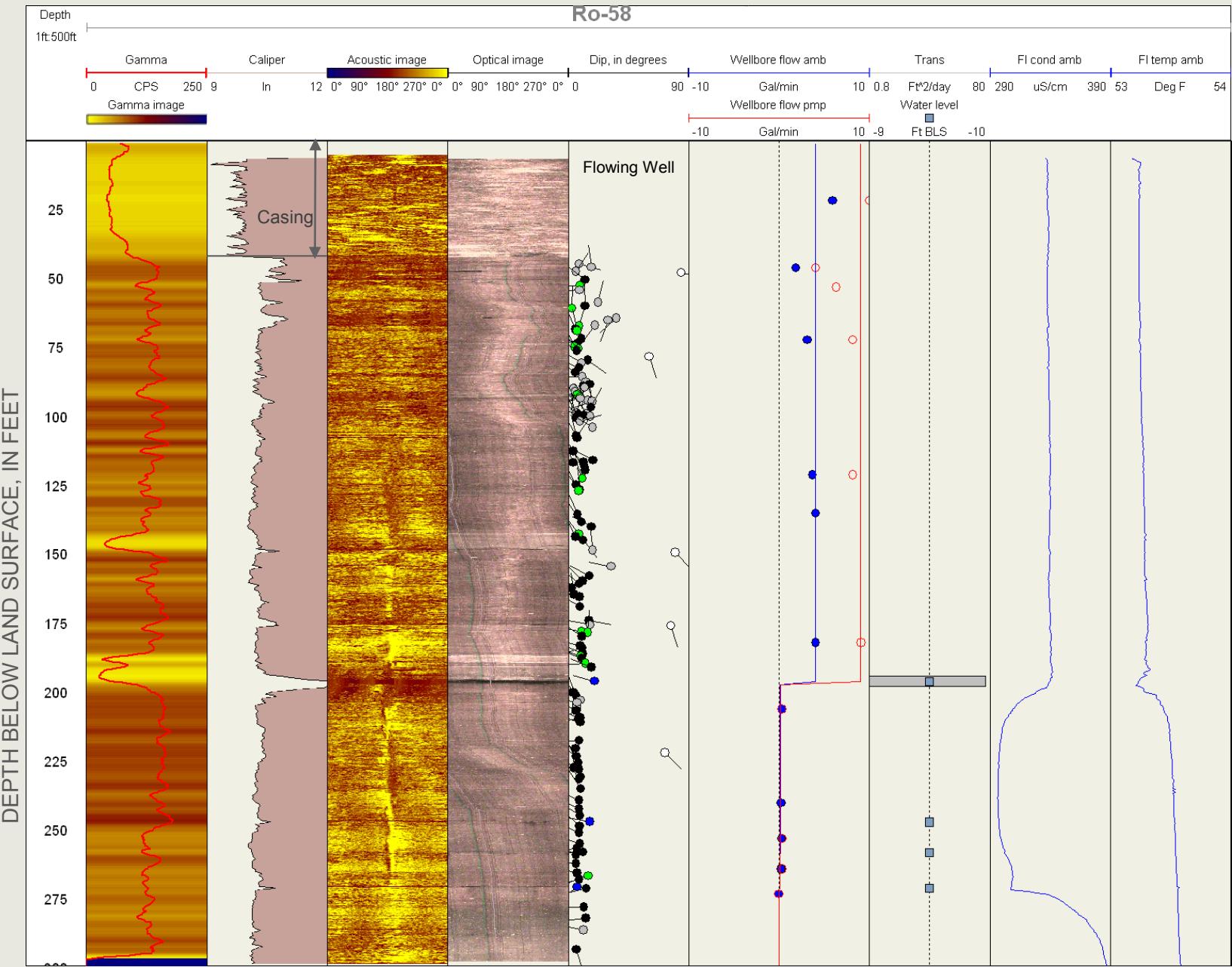
Packer Head.....Water-level (head) measurement from wellbore interval that was isolated with packer(s), in ft below land surface (Ft BLS).

Ro-54

A.

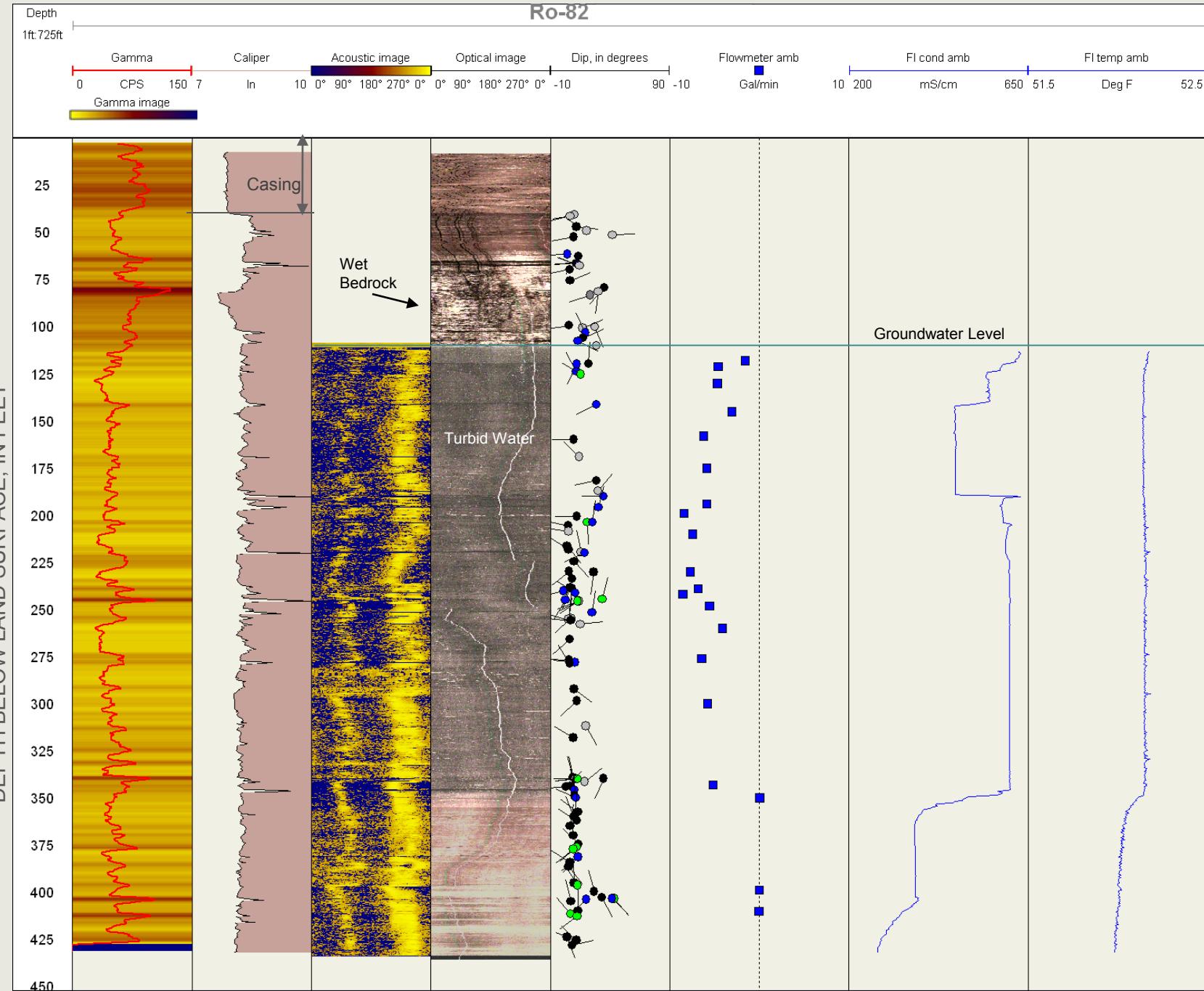


B.

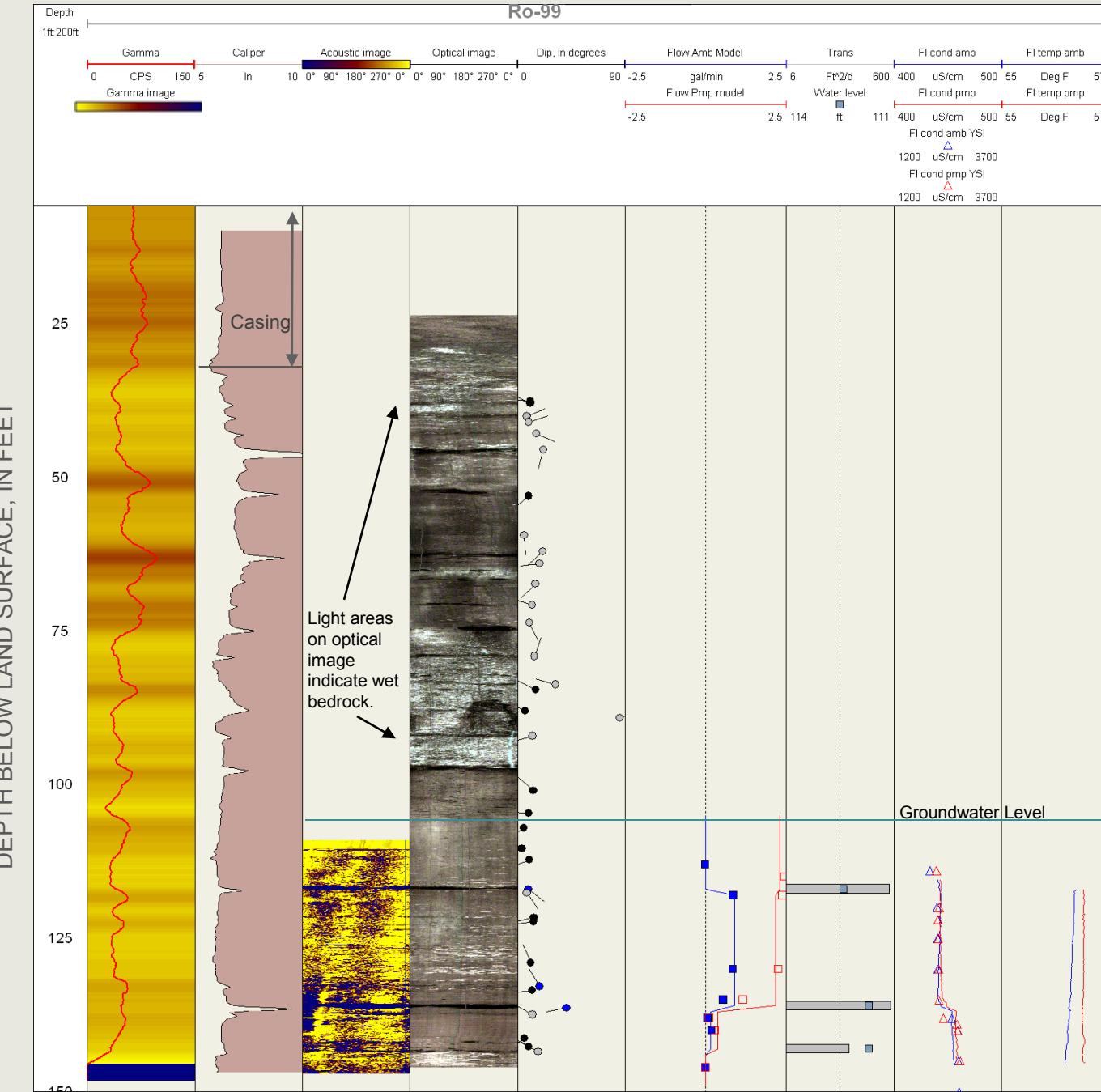


C.

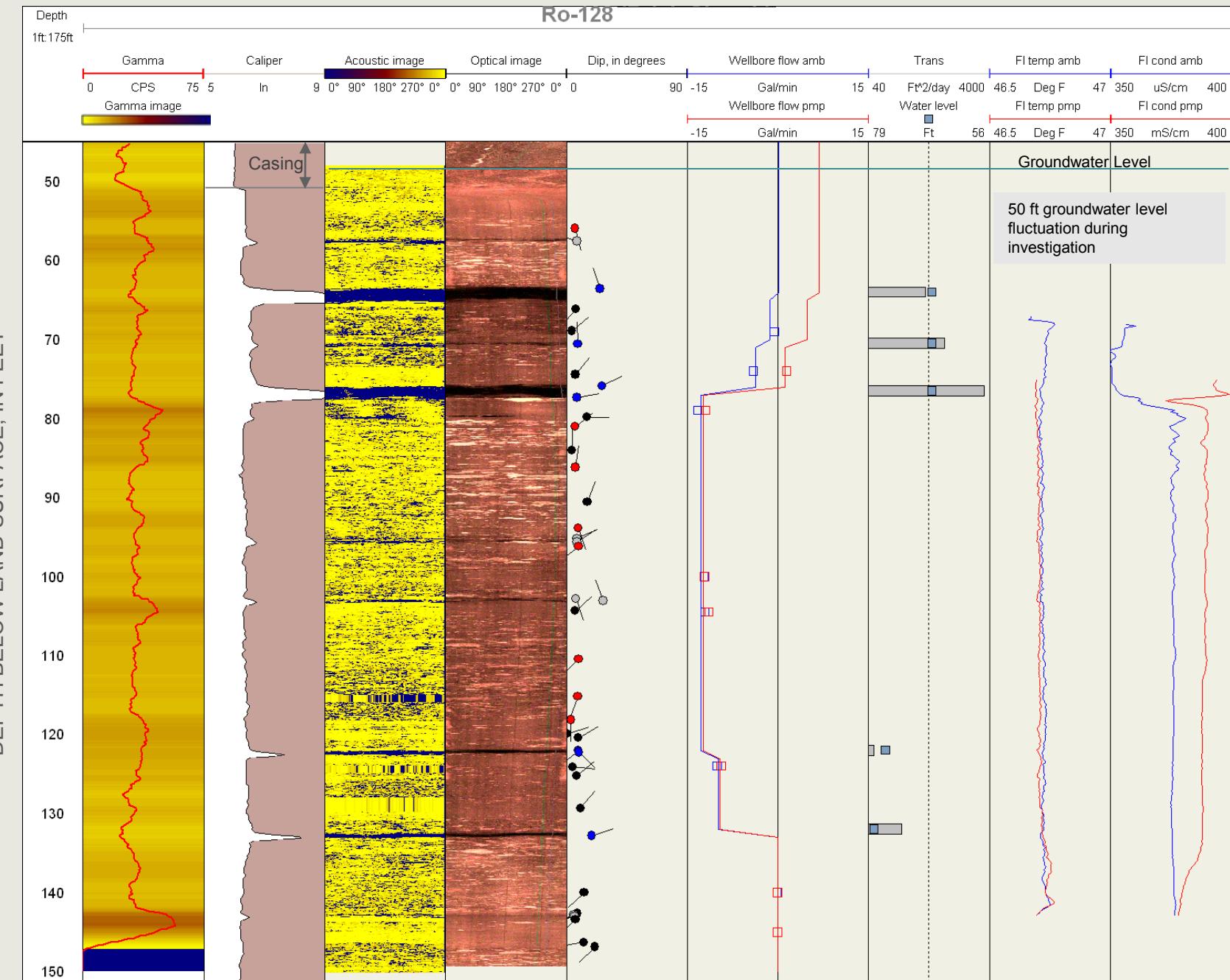
Ro-82



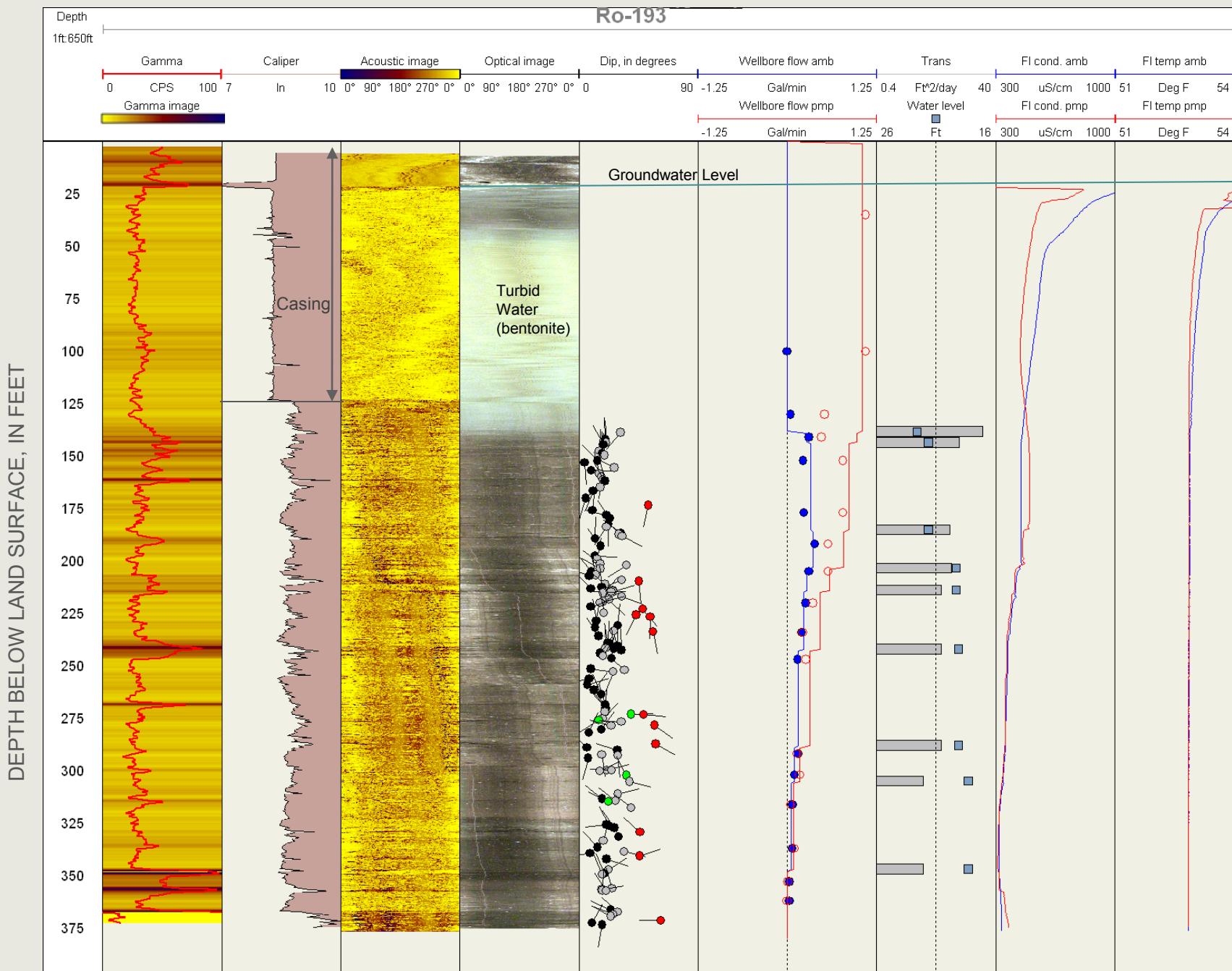
D.



E.

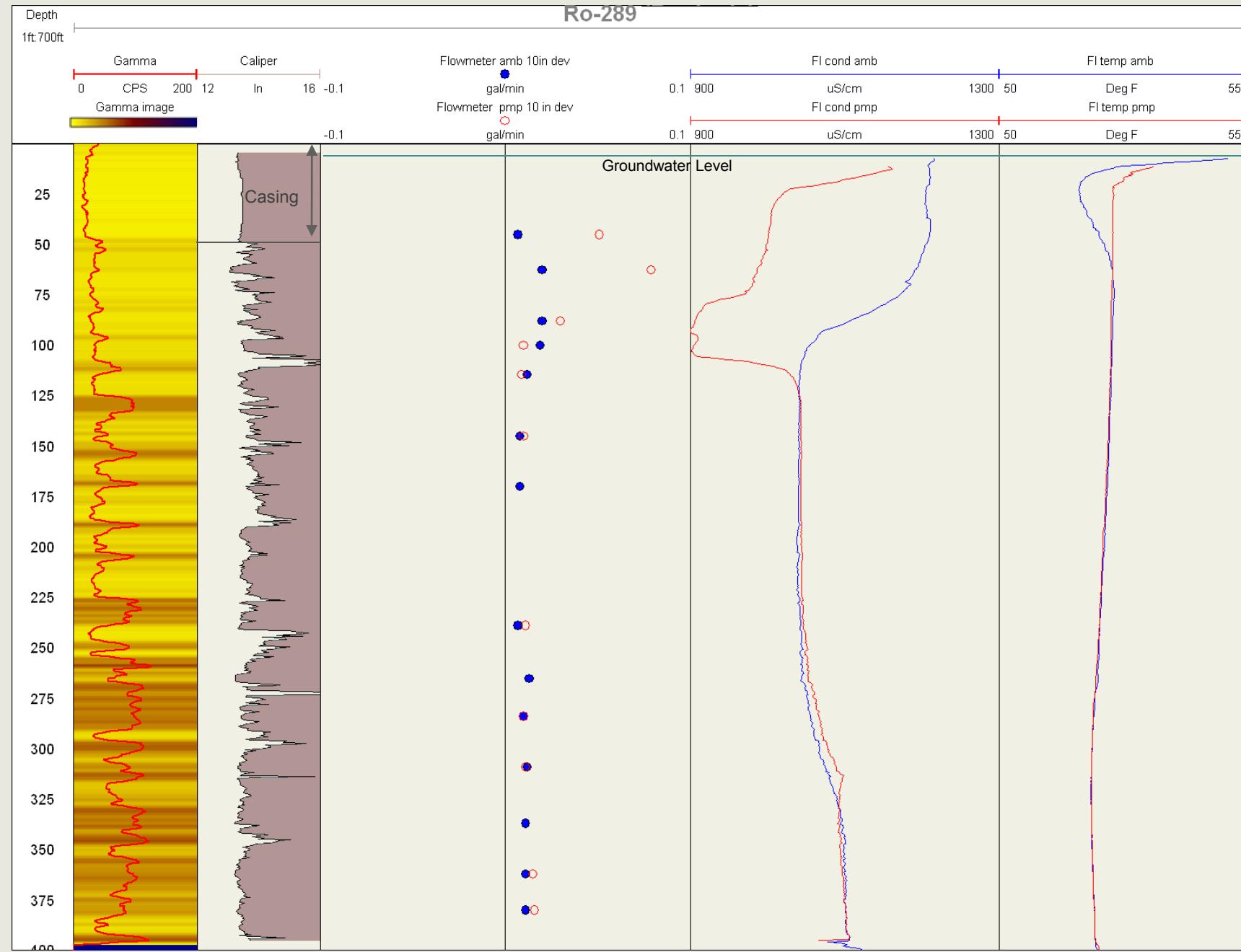


F.



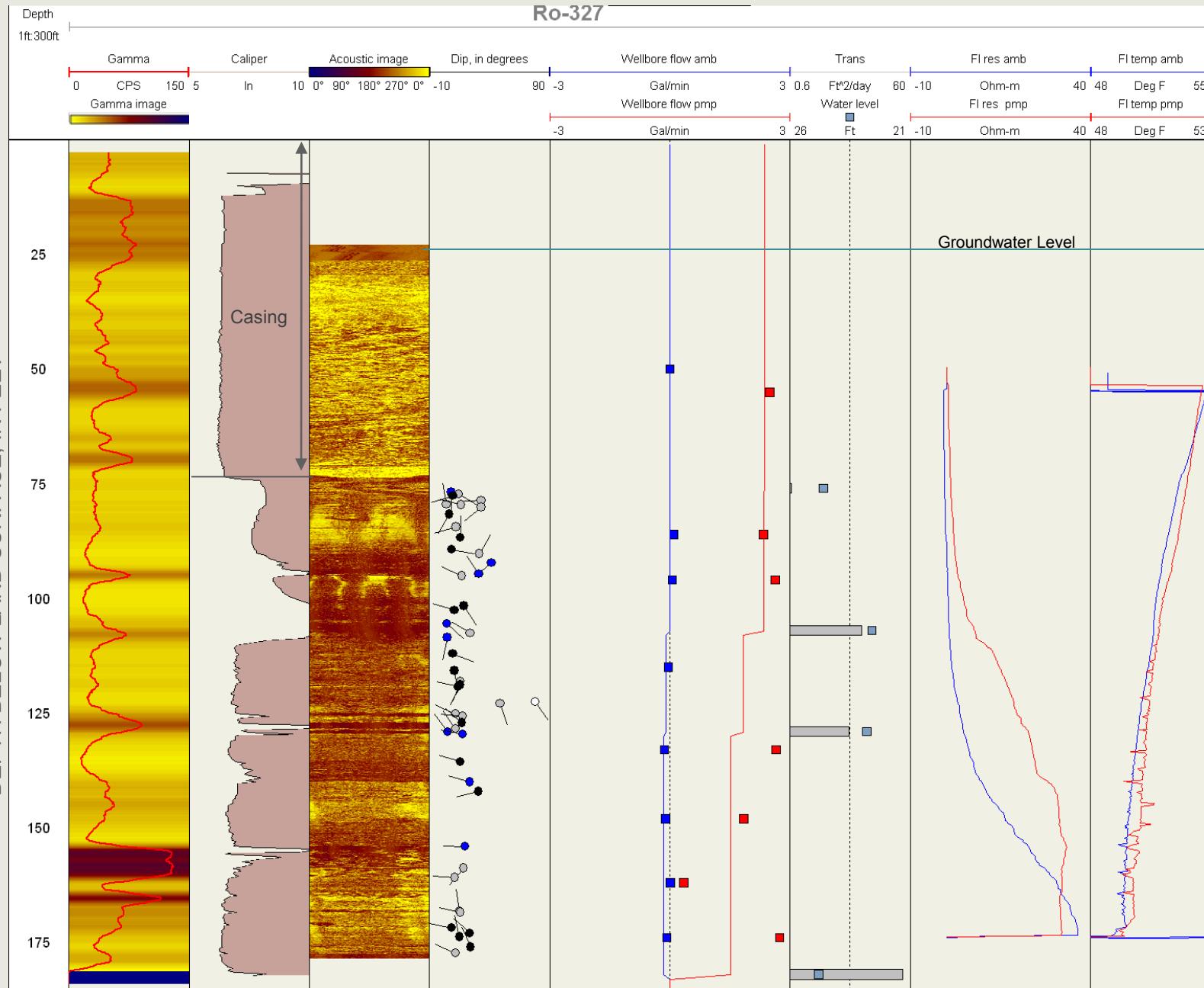
G.

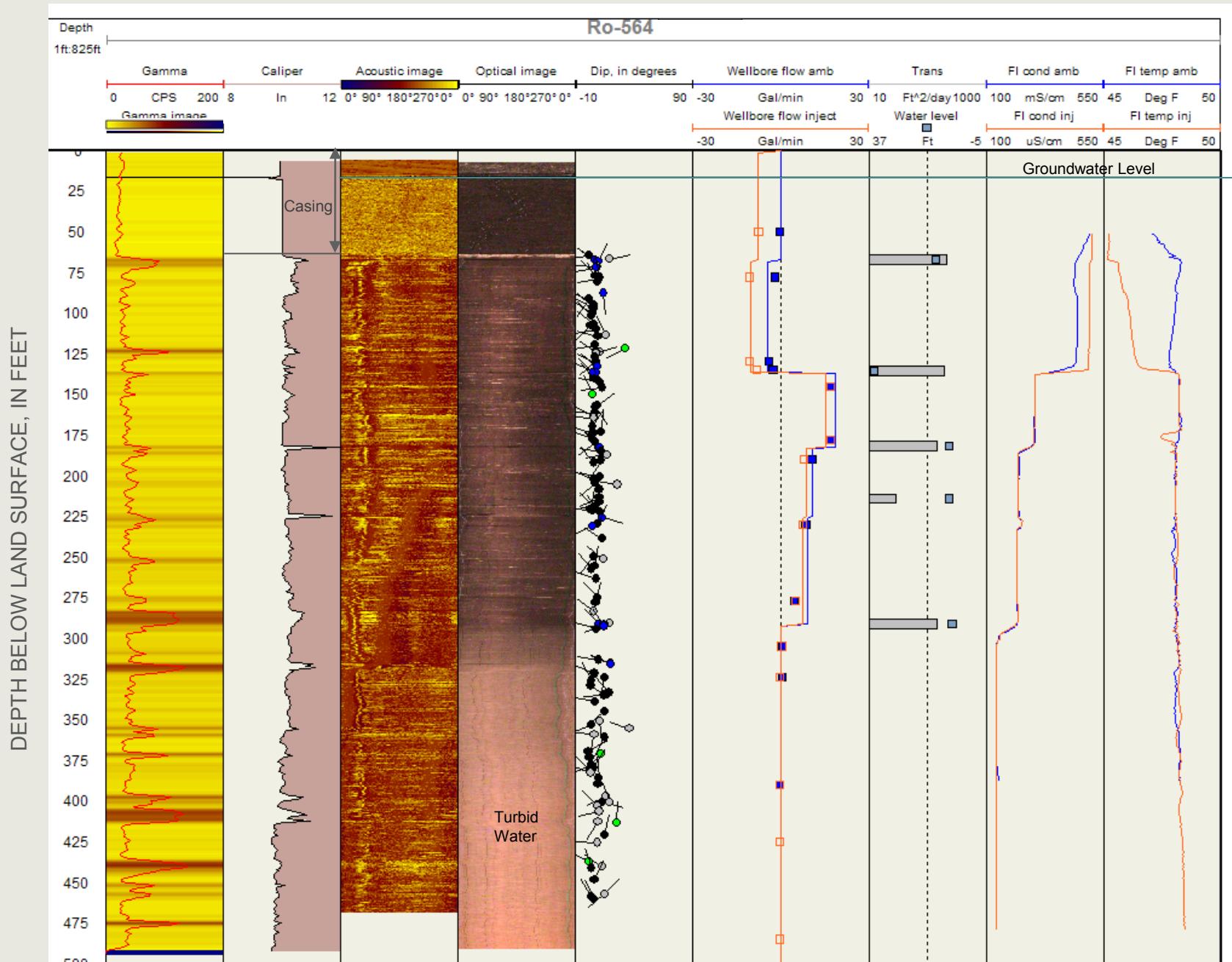
Ro-289



Ro-327

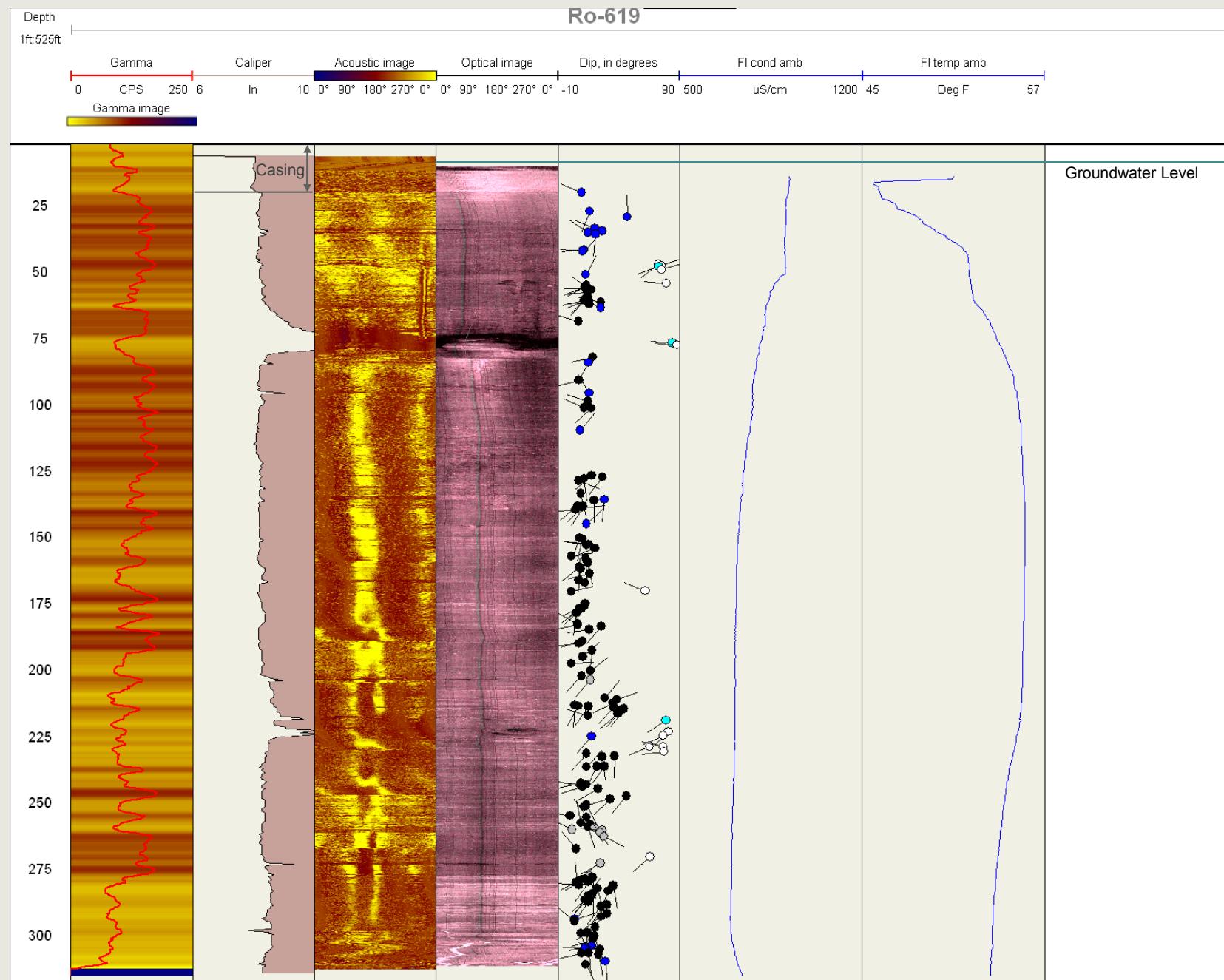
H.



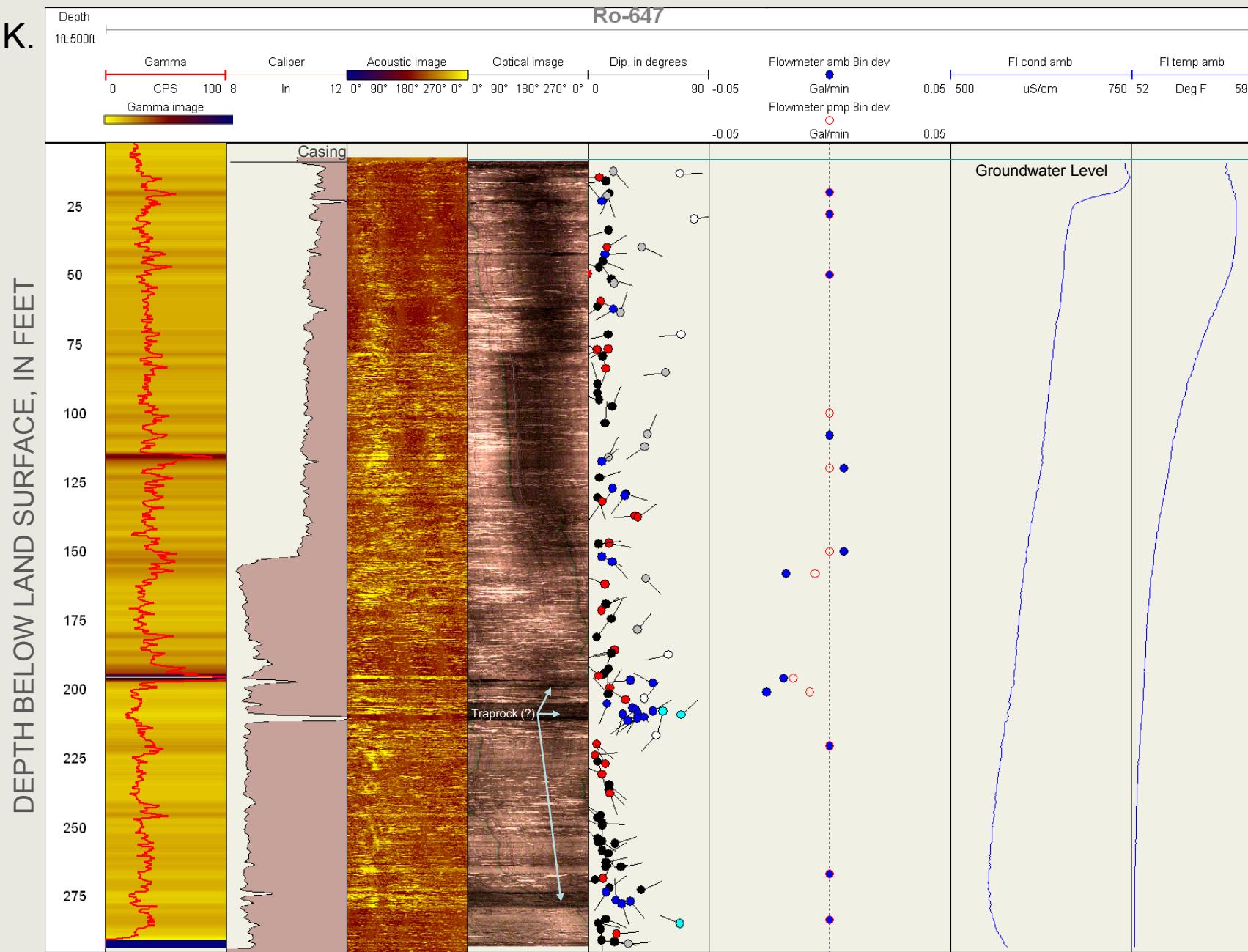


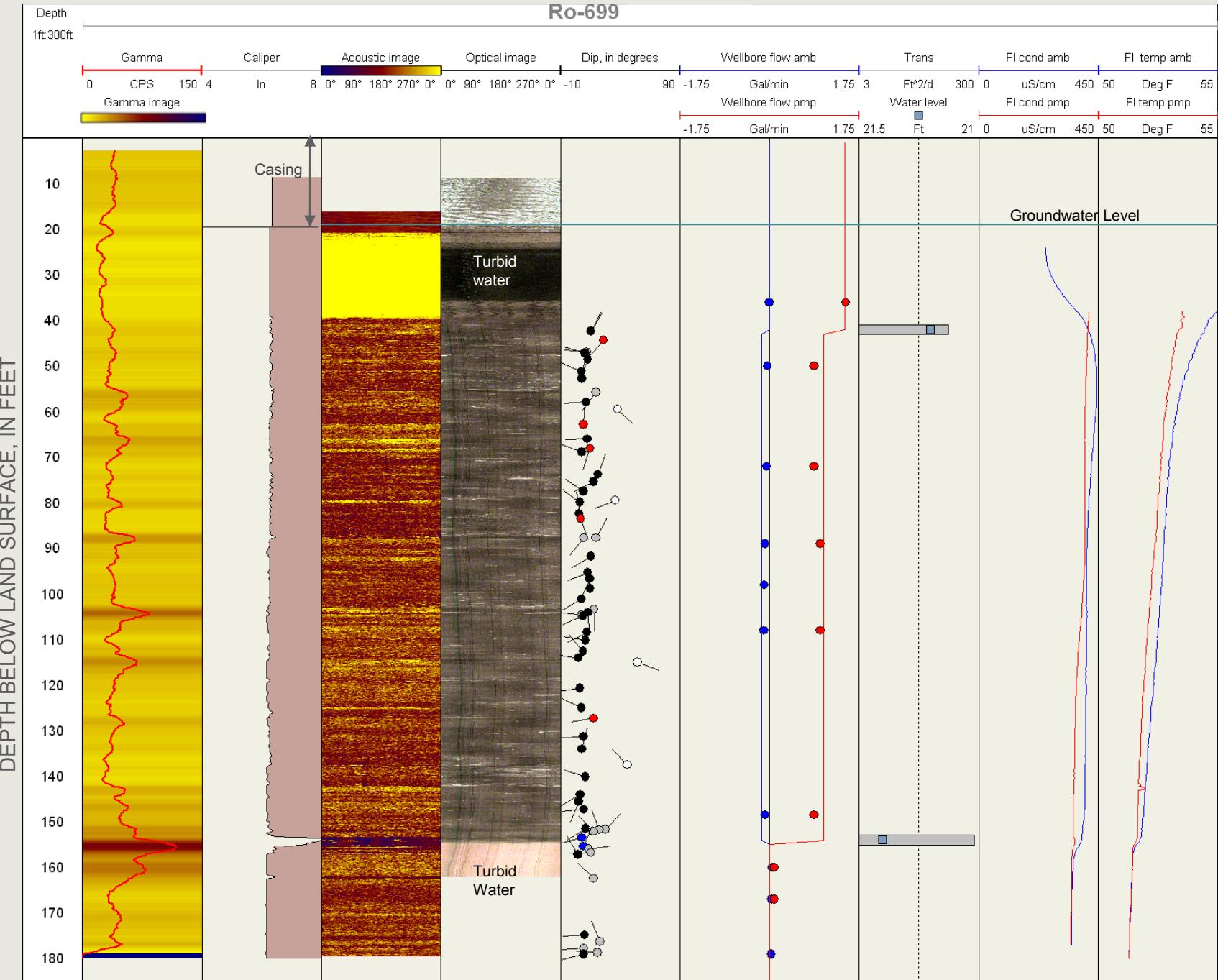
J.

Ro-619



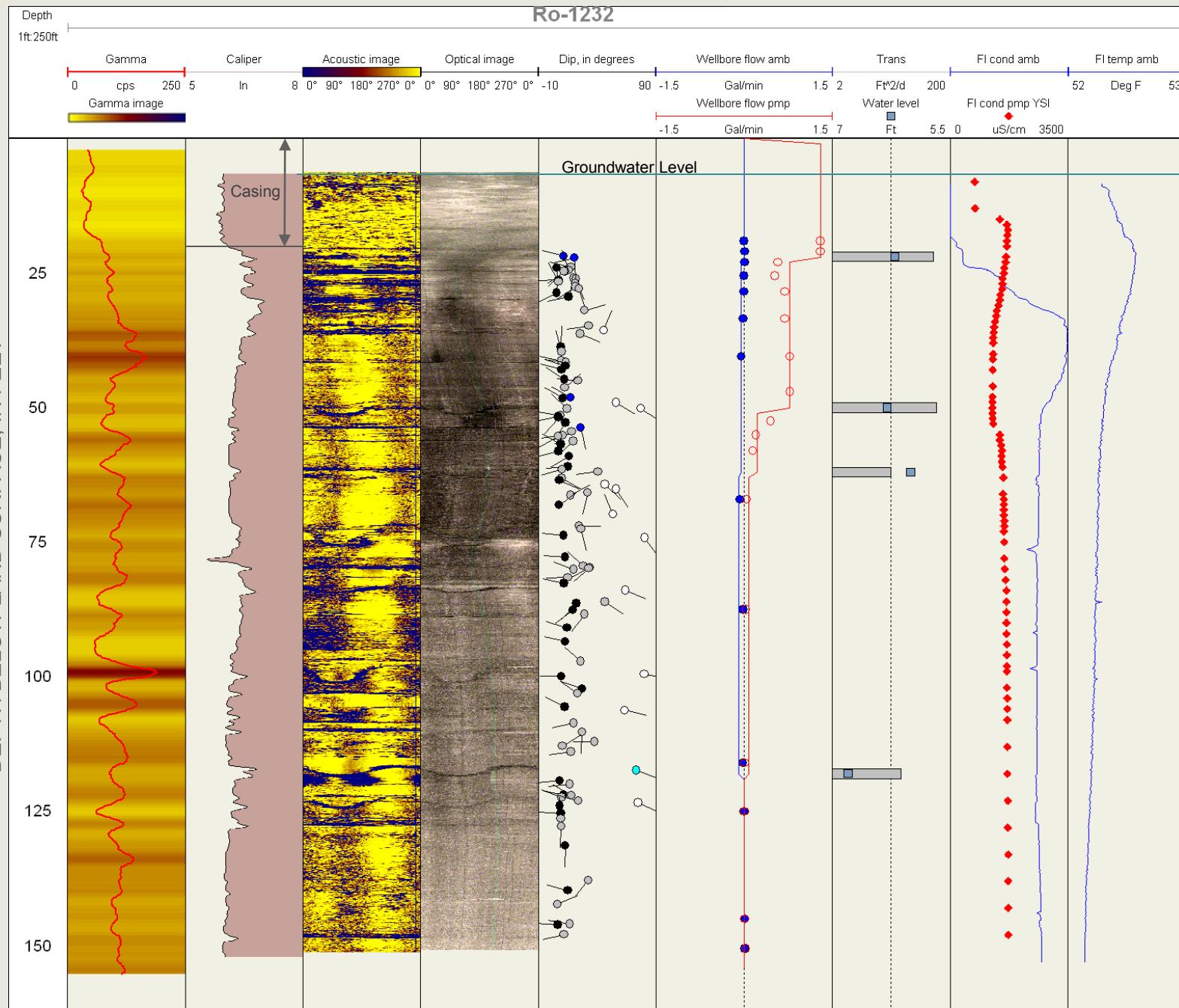
K.





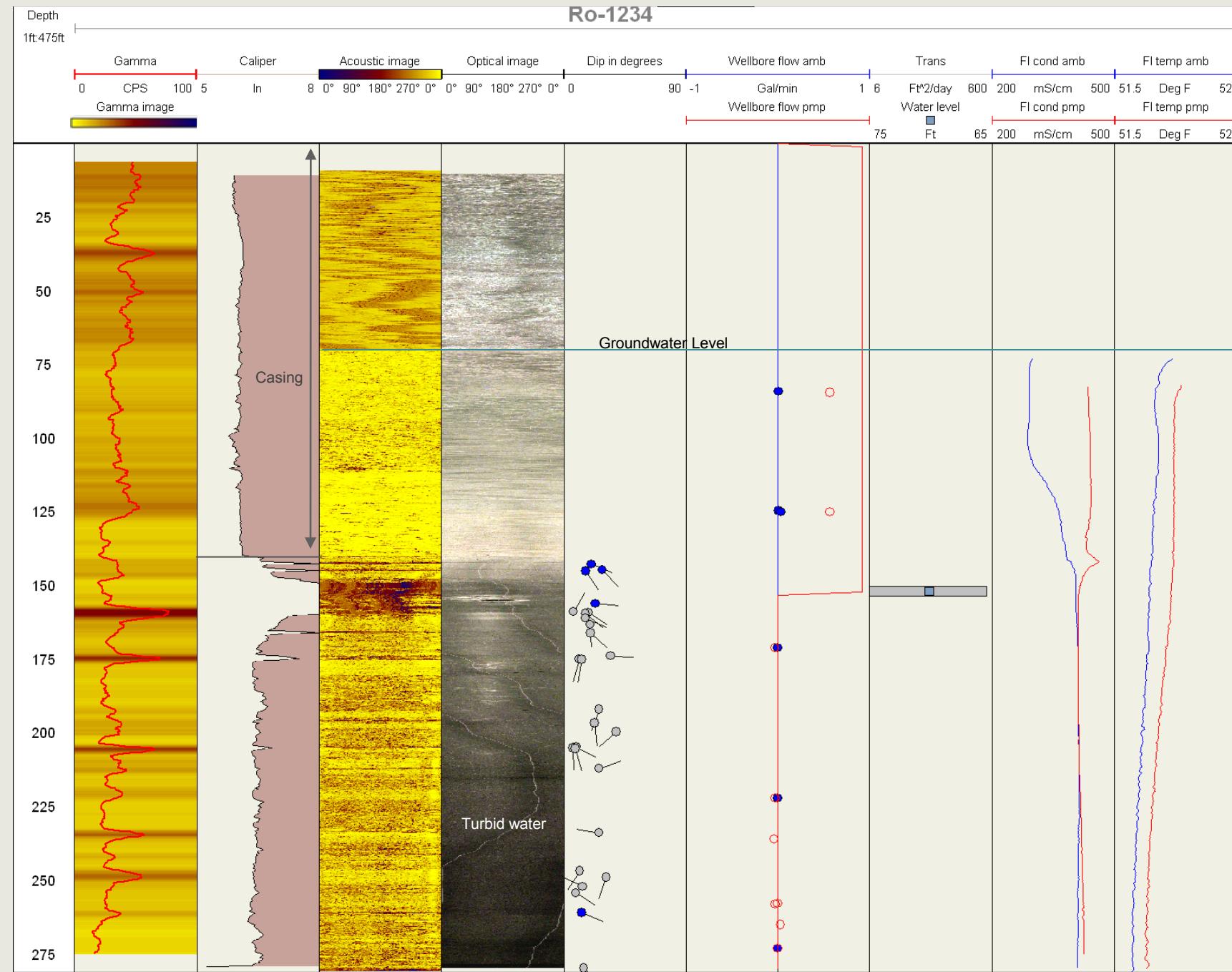
Ro-1232

M.

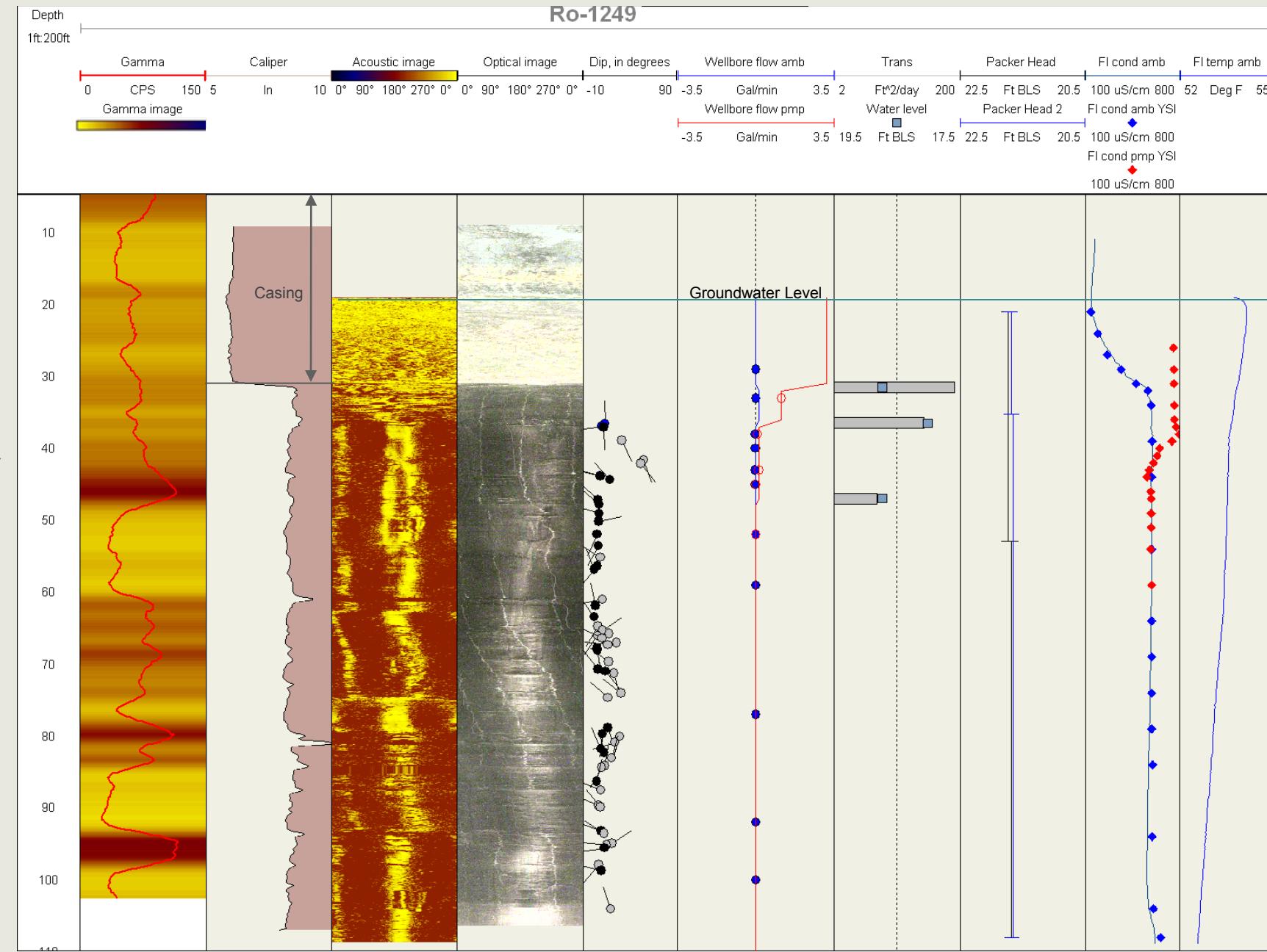


Ro-1234

N.

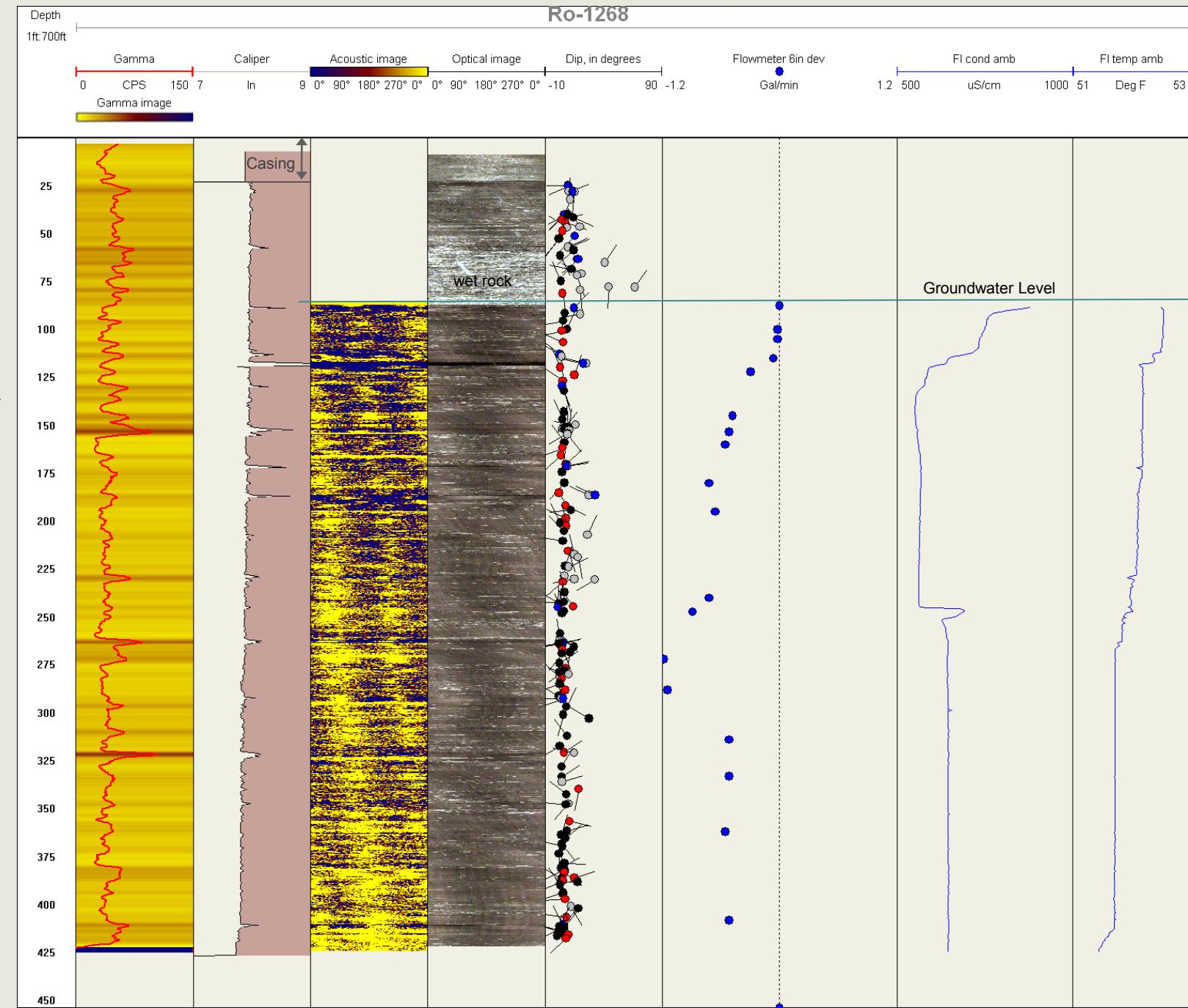


O.

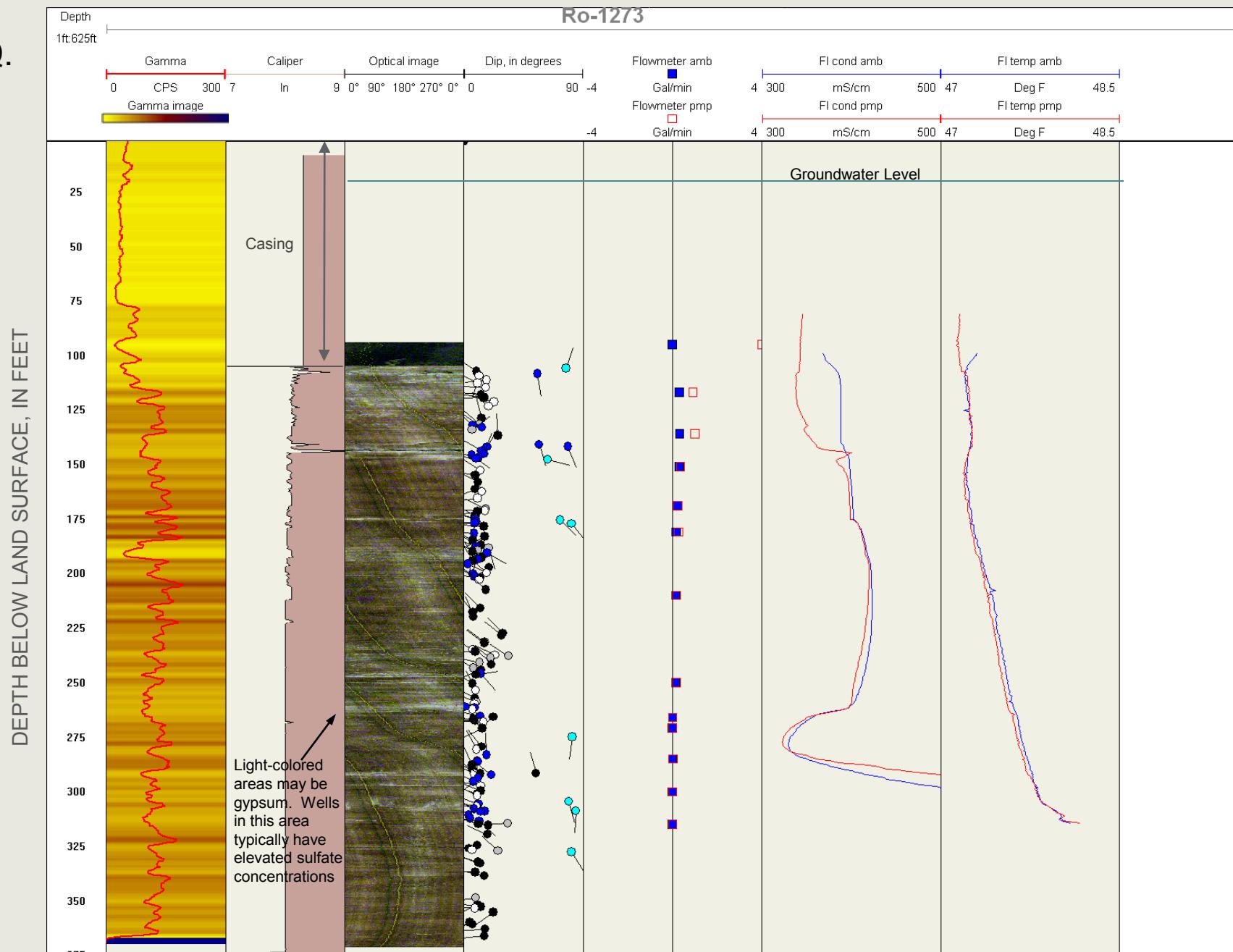


Ro-1268

P.

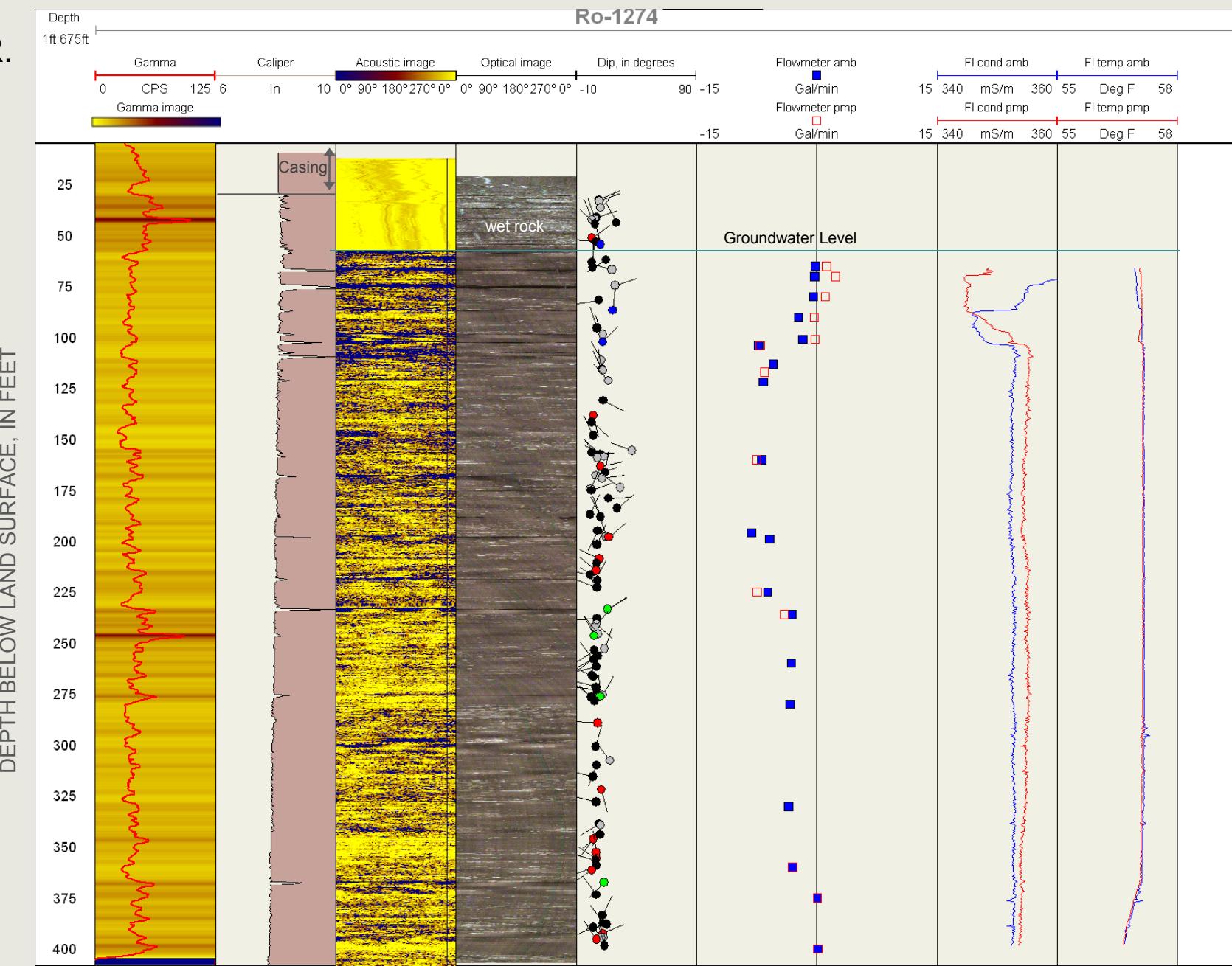


Q.

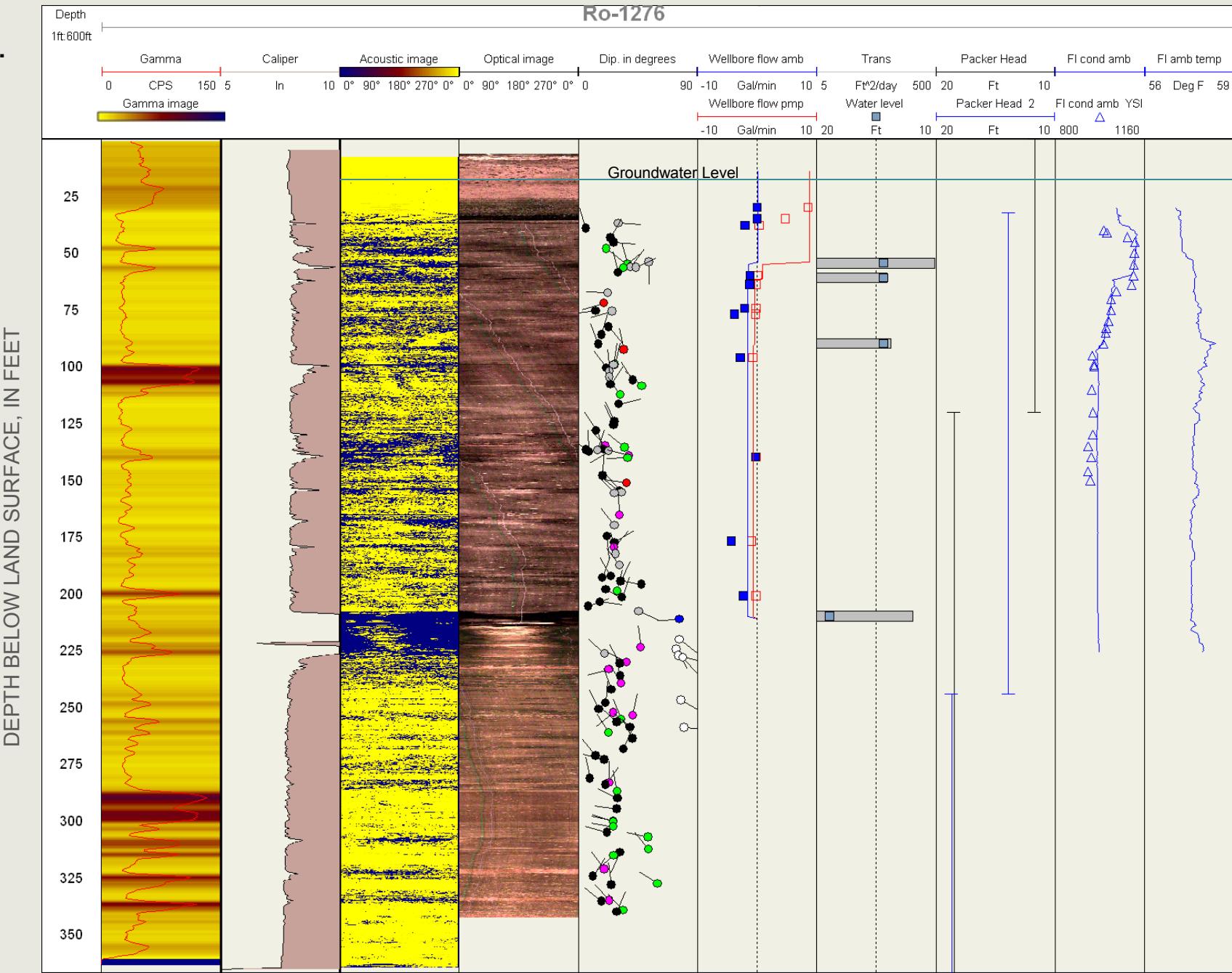


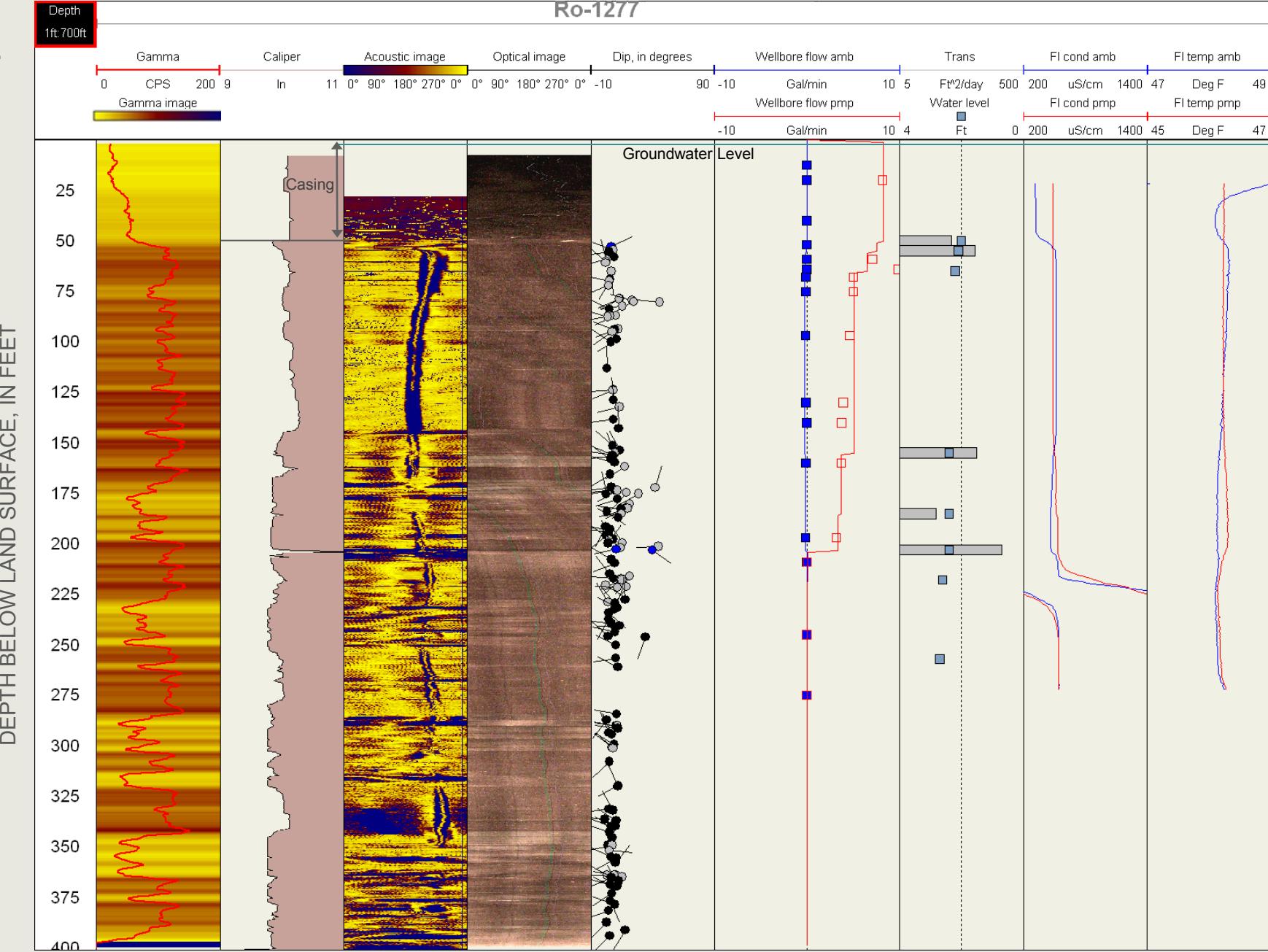
R.

Ro-1274

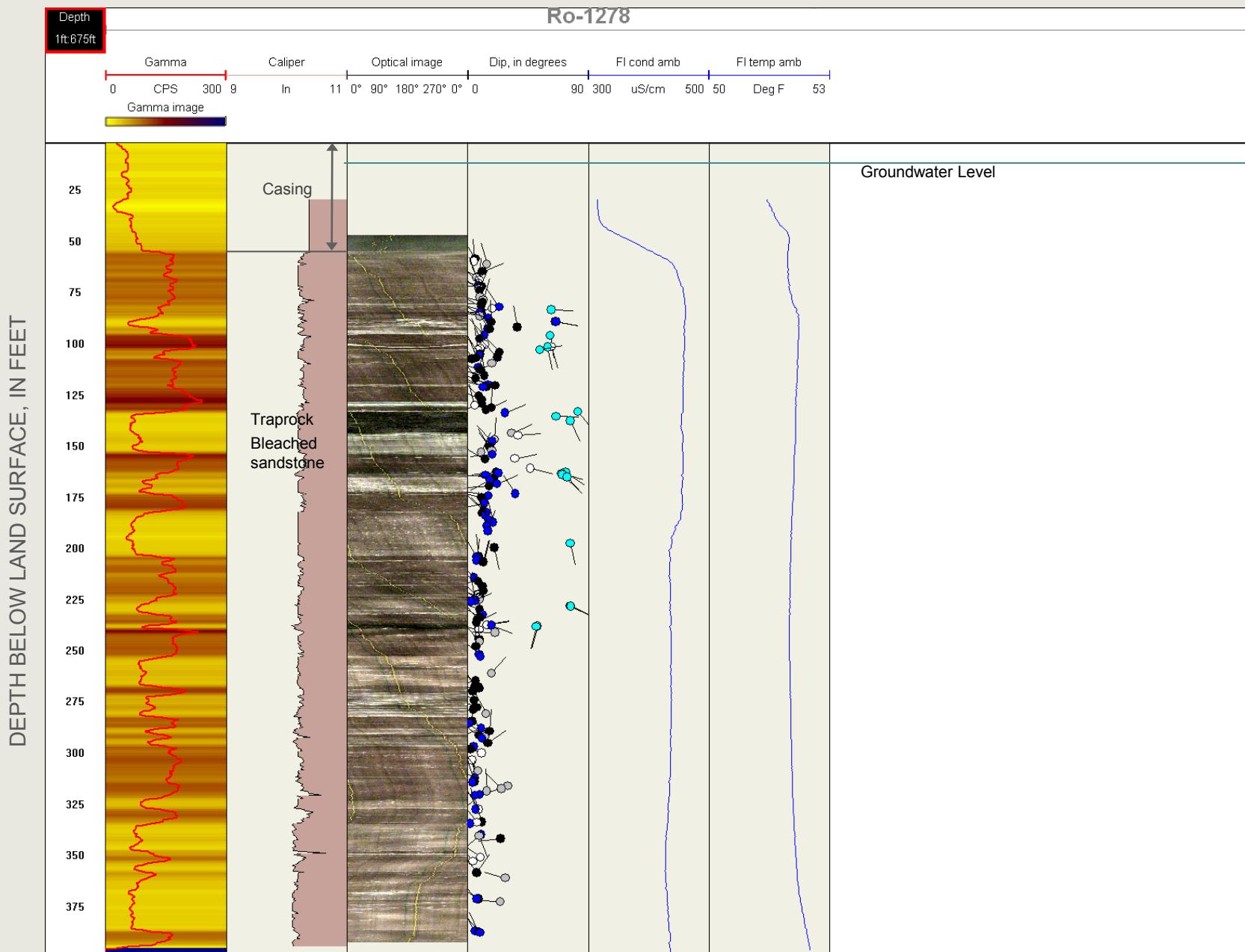


S.

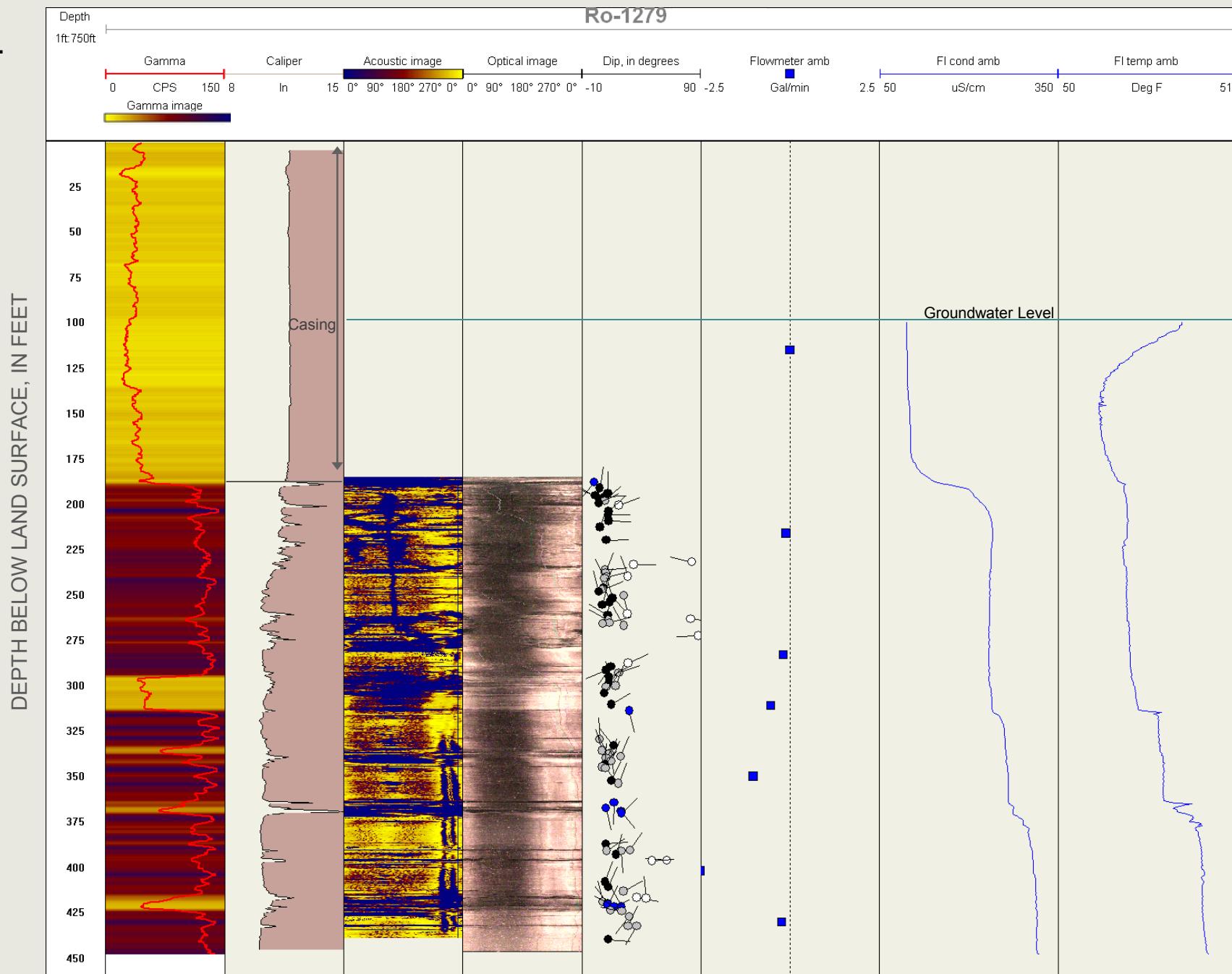




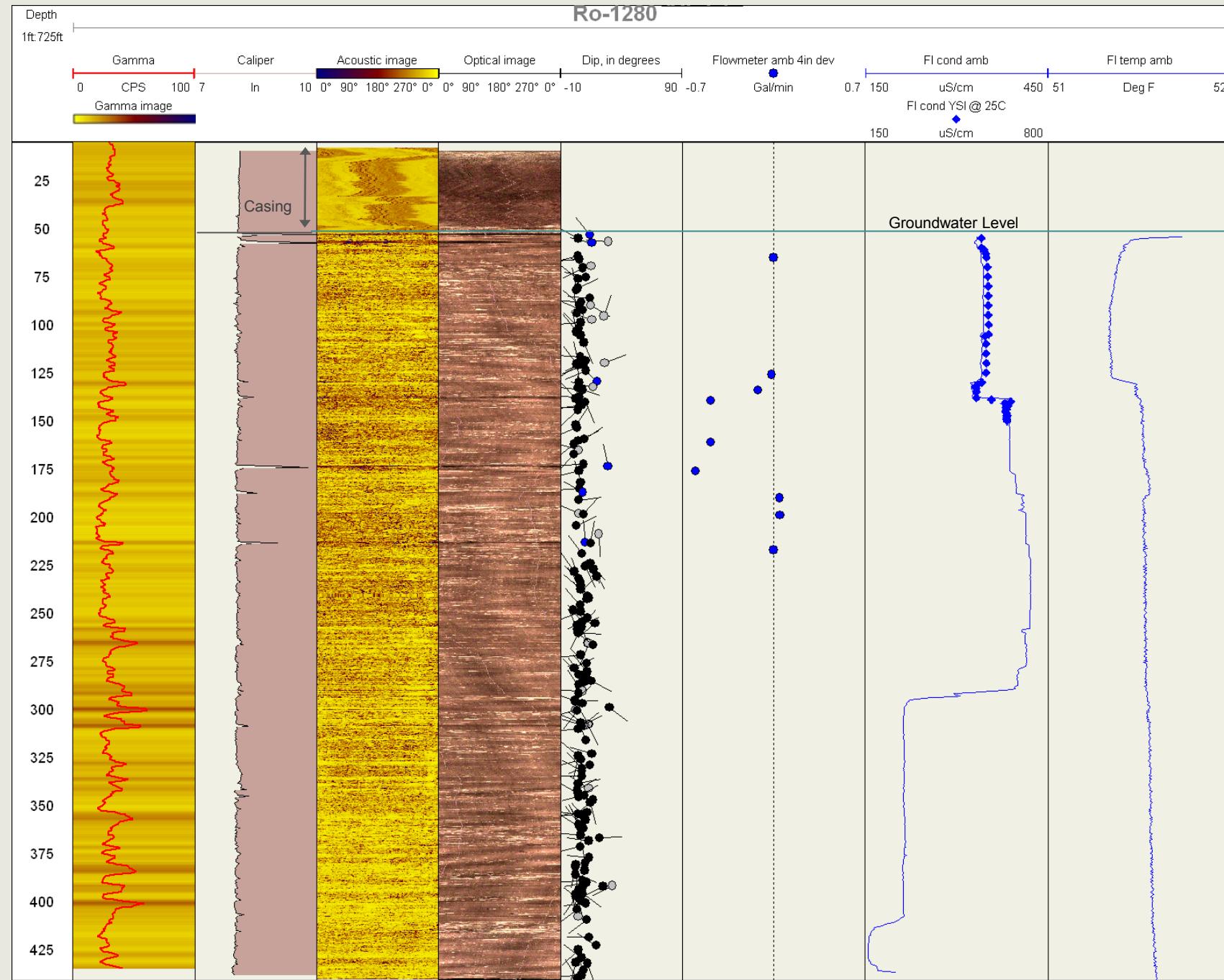
U.



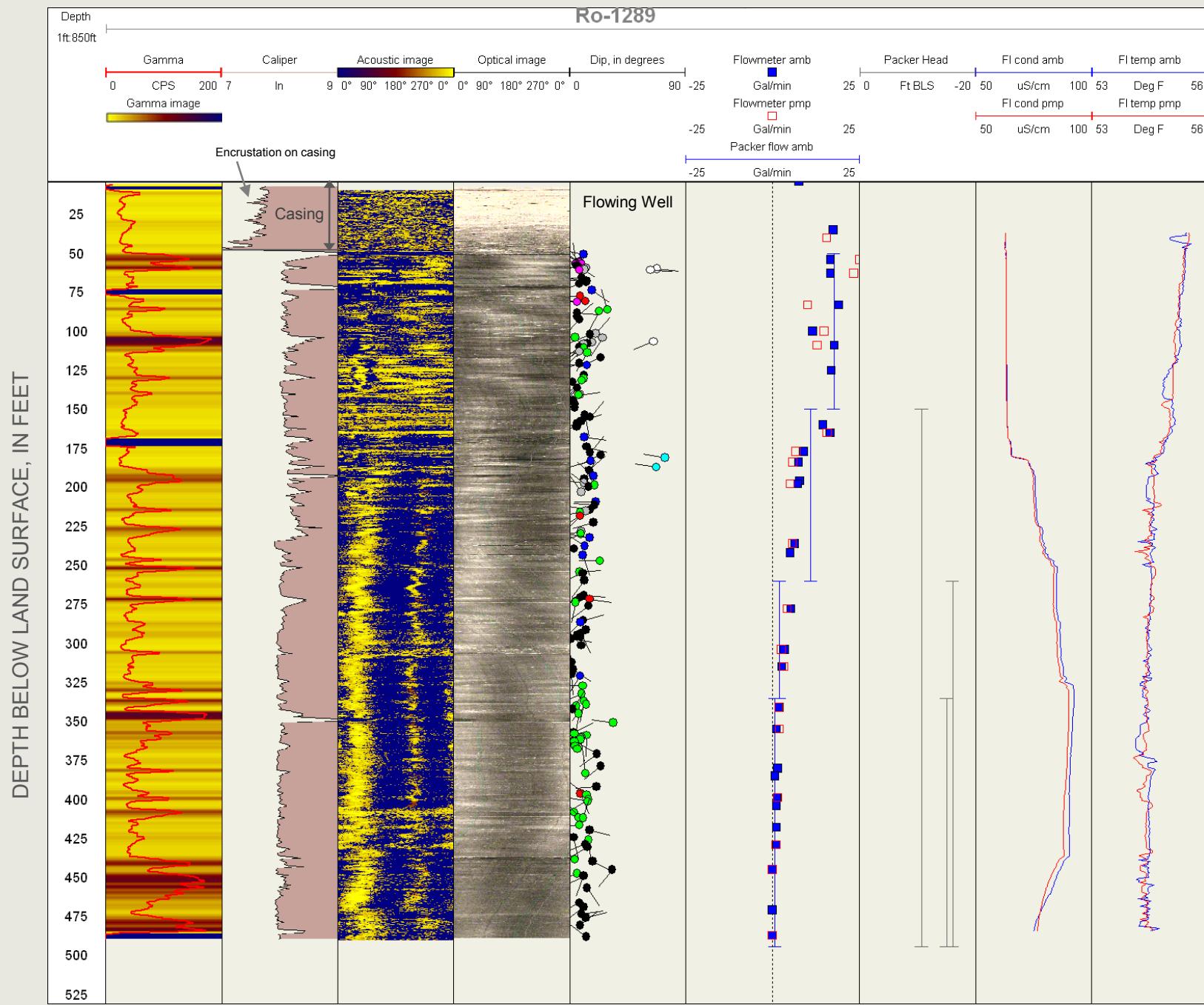
V.



W.



X.



Appendix 1B. Orientation of bedding and fractures from borehole geophysical surveys (median values), Rockland County, New York.

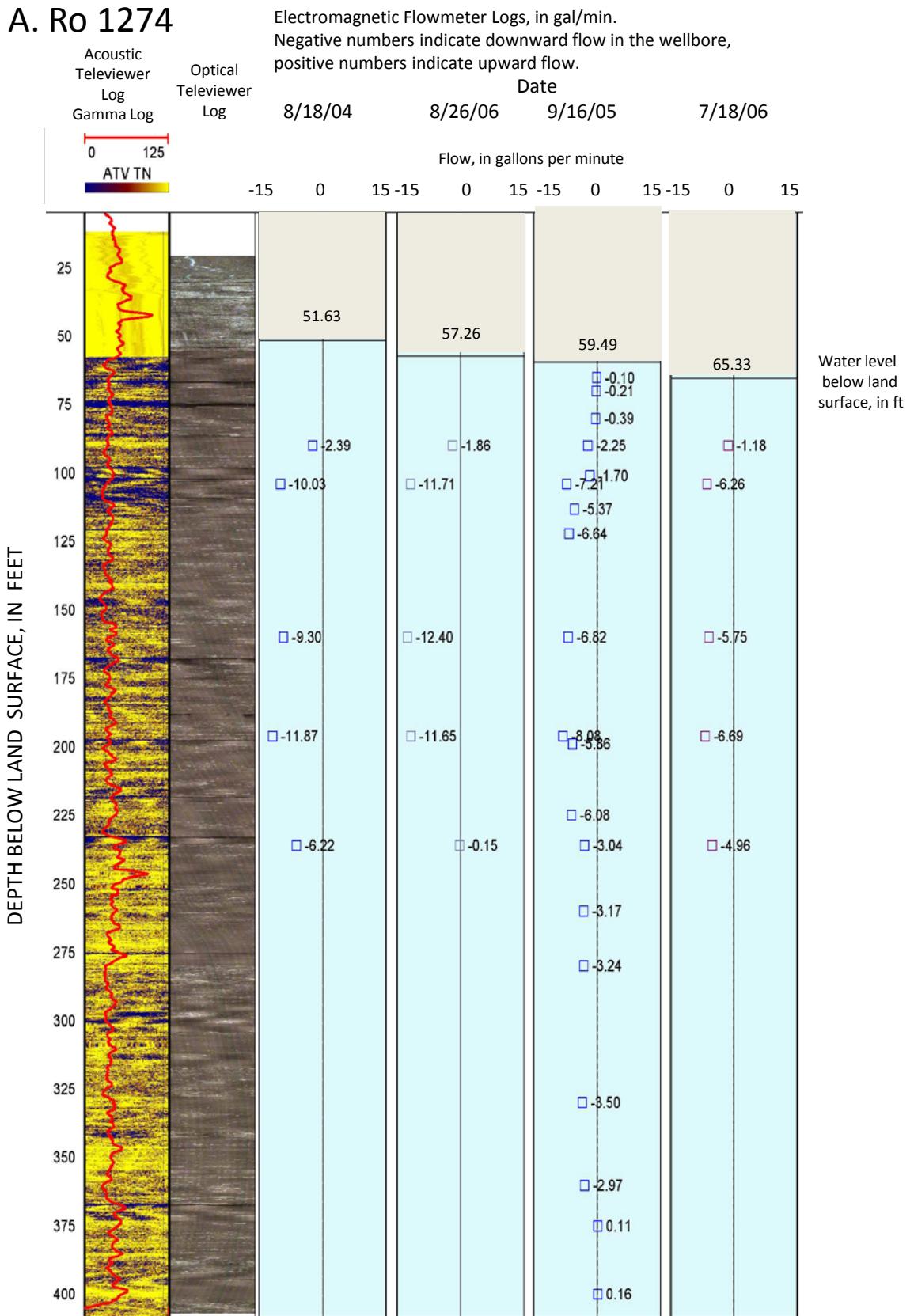
[Wellbores that exhibit changes in orientation with depth are divided into depth intervals. USGS, U.S. Geological Survey; ft, feet; “--”, no data, insufficient data, or no discernable orientation. Data format: Dip azimuth (compass direction of dip (true north)), in degrees, Dip angle from horizontal, in degrees, (Number of measurements)]

USGS well identification number	Depth interval (ft)	Bedding, bedding parting	High gamma zone (fine grained zone)		Low-angle fractures (less than 30 degrees)	Water-bearing low-angle fractures	High-angle fractures (greater than or equal to 30 degrees)	Water-bearing high-angle fractures	Mineral filling, bleaching
			contacts (may be mineralized, bleached, or dissolved and may be offset from each other)	Coarse bedding parting					
Ro-54	91–402	284, 7.7 (103)	302, 9.3 (4)	--	288, 8.0 (18)	298, 9.3 (5)	--, 47 (9)	--	--
Ro-58	42–150	312, 9.2 (30)	301, 7.6 (12)	--	1315, 12.6 (22)	--	--, 70 (4)	--	--
	150–299	296, 8.3 (46)	266, 12.7 (5)	--	281, 10.1 (4)	280, 15.3 (3)	--, 72 (3)	--	--
Ro-82	40–443	3051, 9.5 (49)	(235,325), 12.9 (10)	--	1275, 14.3 (20)	(10, 270), 12.8 (20)	--, 30 (3)	--, 35 (3)	--
Ro-99	27–145	275,13.5 (17)	--	--	--, 13.5, (12)	-, 16.4 (2)	--	--, 39 (2)	--
Ro-128	50–140	50, 7.1 (12)	--	172, 7.8 (8)	--, 8.0 (5)	701, 9.8 (7)	--	--	--
	140–151	227, 13 (5)	--	--	252, 5.8 (2)	--	--	--	--
Ro-193	123–375	342, 18.3 (44)	--	--	--, 20.1 (42)	--, 21.1 (6)	172, 51 (12)	--	--
Ro-289	49–477	--	--	--	--	--	--	--	--
Ro-327	74–186	2701, 15.1 (17)	--	--	284, 15.2 (15)	271, 8.4 (7)	--, 33.3 (4)	--	--
Ro-619	20–313	224, 10.2 (121)	--	--	222, 11.6 (29)	222, 11.1 (21)	249, 70 (15)	250, 73 (3)	--
Ro-647	9–295	751, 12.2 (49)	--	--, 12.0 (18)	--, 19.2 (5)	--	--, 65 (12)	--, 40 (12)	--
Ro-699	38–183	264, 9.8 (36)	--	--, 15.1, (5)	269, 18.0 (15)	-, 9.2 (3)	--, 42 (4)	--	--
Ro-1232	21–154	280, 11.0 (36)	--	--	1270, 16.9 (46)	271, 17.7 (4)	1251, 46 (19)	109, 73 (1)	--
Ro-1234	140–280	--	--	--	(125, 195), 11.3 (21)	112, 15.1 (5)	--	--	--
Ro-1249	31–109	284, 10.1 (25)	--	--	1290, 15.8 (22)	283, 13.7 (3)	--, 38.2 (7)	--	--
Ro-1268	23–280	3101, 6.1 (74)	--	--, 7.1 (34)	--, 10.9 (35)	--	--, 43 (4)	--	--
	280–423	305*, 5.1 (33)	--	--, 7.5 (13)	--, 10.1 (5)	334, 5.2 (1)	--	--	--
Ro-1270	64–295	285, 9.2 (36)	278, 8.4 (36)	--	--, 17.6 (5)	269, 12.6 (7)	--	--	--
	295–495	204, 8.2 (14)	234, 13.0 (21)	--	246, 8.6 (4)	--	--	--	--
Ro-1273	105–375	287, 10.2 (61)	--	--	290, 10.5 (14)	275, 8.2 (35)	145, 78 (8)	158, 76 (8)	292, 9.7 (27)
Ro-1274	29–408	3151, 7.2 (53)	--, 11.8 (4)	--, 7.1 (14)	1335, 11.1 (28)	--, 12.9 (6)	--, 37 (1)	--	--
Ro-1276	36–367	3401, 12.5 (51)	3251, 15.9 (16)	--, 18.5 (3)	1320, 14.1 (17)	--	128, 60 (7)	--	317, 14.2 (13)
Ro-1277	49–403	2851, 8.3 (86)	--	--	261, 11.0 (39)	--, 8.9 (2)	--, 45 (3)	--	--
Ro-1278	55–400	298, 9.6 (70)	--	--	293, 14.3 (20)	292, 11.1 (52)	--, 66 (3)	133, 70 (15)	284, 9.1 (25)
Ro-1279	187–447	201, 11.9 (32)	--	--	125, 12.3, 32	--, 17.4 (9)	--, 47 (10)	--	--
Ro-1280	50–441	305, 6.8 (151)	--	--	274, 13.5 (21)	312,14.3 (7)	--	--	--
Ro-1289	50–494	245, 10.6 (69)	247,9.7 (41)	--, 8.5 (5)	1245, 11.4 (12)	1270, 13.0 (12)	--	279, 70 (2)	286, 7.5 (6)

¹Censored histogram estimate. When many different orientations occur at low frequencies, those low frequencies (either 1 or 2 measurements) are subtracted from all occurrences, and the median of the remaining occurrences, to the nearest 10 degrees, was used in this table.

Appendix 1C. Repeat borehole flow logs at two bedrock wells (Ro 1274, Ro 1276) completed in the Newark Basin aquifer, Rockland County, N.Y.

A. Ro 1274



B. Ro 1276

